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Research Article

Polyherbal Drops for Antifungal Activity on Human Clothing

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ABSTRACT

Fungal contamination of clothing is a common issue caused by moisture retention, poor ventilation, and organic residues, leading to fabric damage, unpleasant odors, and potential health risks. Conventional chemical antifungal treatments may be effective but often pose environmental and health concerns. This study explores the use of antifungal herbal drops as a natural and eco-friendly alternative for removing fungal infections from fabrics. Herbal extracts with proven antifungal properties, such as Lantana camara leaves, Cinnamon, Clove and Ginger are evaluated for their effectiveness against common fabric fungi. The study investigates their antifungal activity, application methods, and long-term effects on fabric integrity. Results indicate that herbal antifungal drops inhibit fungal growth making them a sustainable alternative to chemical treatments. This research highlights the potential of plant-based antifungal solutions in textile care, promoting a safer and more environmentally friendly approach to fungal decontamination.

INTRODUCTION

Fungal infections on human clothes typically result from the presence of fungal spores, which thrive in warm, moist environments. These spores can contaminate clothing, bedding, or personal items and can potentially cause various skin infections. Some common fungal infections that may involve human clothes include Athlete's foot (Tinea pedis), Ringworm (Tinea corporis), Candida infections, and Dermatophytosis. Humans are associated with around 600 fungus strains that cause some of the most fatal infectious diseases. The most dangerous people are those with weakened immune systems, but both well-known and newly discovered infections can endanger healthy people. primarily when a substantial inoculum is present in the infection. The development and dissemination of fungal parasites that are resistant to all current classes of antifungal medications, along with the growth in the incidence of invasive fungal infections

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worldwide, pose a serious threat to human health. Despite the fact that numerous fungi are linked to humans, only few of them are harmful pathogens. In nature, the fungus kingdom grows at room temperature since the typical body temperature of Because humans are high, most fungi do not enter the body; hence, fungi that cause ringworm, athlete's foot, and other skin conditions are typically located on the outside or exterior side of the body. Under normal conditions, a few species thrive inside the body. There are only few fungal species that cause the majority of human diseases in hosts with healthy immune systems. Numerous fungi can cause illness in immunocompromised hosts.[1]

Table no. 1: Classification of fungal infections related cloth :

Infection	Cause	Cloth Relation	Example
Tinea corporis	Dermatophytes	Wearing infected clothes (shirts, dresses)	Ringworm of the body
Tinea pedis	Dermatophytes	Using shared socks, shoes, towels	Athlete's foot
Tinea cruris	Dermatophytes	Wearing tight, sweaty underwear	Jock itch (groin infection)
Tinea capitis	Dermatophytes	Sharing hats, scarves	Scalp ringworm
Tinea manuum	Dermatophytes	Using contaminated gloves	Hand fungal infection
Onychomycosis	Dermatophytes	Wearing infected gloves, socks	Nail fungus

Sign and Symptoms :

- In clothes, fungal infections usually show as mold or mildew growing on the fabric. Here's what you might notice:
- Musty or sour smell (even after washing)
- Discoloration — like black, green, or white patches
- Spots or stains that look fuzzy or powdery
- Fabric weakening — cloth may tear easily where the fungus has grown
- Slimy or damp texture in some spots

Herbal Treatment For Fungal infection on human cloths :

1) Lantana Camara Linn. :

The flowering ornamental plant Lantana camara Linn. is a member of the Verbenaceae family. L. camara is sometimes referred to as West Indian lantana, Lantana, Surinam Tea Plant, and Wild Sage. It is likely that L. camara was brought to India prior to the 19th century. Presently, L. camara can be found all over India in areas with slopes that drain well and moderate to high summer rainfall. Though some or all of them can thrive on siliceous sands and sandstone-derived soils if they are of modest depth and other conditions, particularly year-round precipitation, are favorable, the majority of forms prefer fertile organic soils. Recent scientific research has highlighted the potential application of L. camara in contemporary medicine, as it is a well-known medicinal plant in traditional medicine. Documenting L. camara's medicinal qualities and its potential for future scientific research in order to create potent therapeutic molecules is the goal of this review. [2]

Taxonomy :

Table no. 2 : Taxonomy of lantana camara linn

Kingdom	Planate
Division	Magnoliophyta
Class	Magnoliopsida
Order	Lamiales
Family	Verbenaceae
Genus	Lantana
Species	Lantana camara Linn.

Plant description: A short, upright or subscandent, vigorous shrub, L. camara has a tetrangular stem, robust, recurved leaves, and a powerful, black-current odor. The plant can reach heights of 1 to 3 meters and widths of up to 2.5 meters. Oval or rectangular, acute or subacute, crenate serrate, rugose above, and scabrid on both sides are the characteristics of the leaves. The green leaves measure 3–8 cm in length and 3–6 cm in width. Rough hairs cover the stem and leaves. Umbels are tiny flowers that are held in bunches. The flower's color typically changes as it ages, sometimes shifting from orange to white to red in different shades. Almost all year long, the axillary head of flowers has a yellow neck. The limb spreads 6 to 7 mm wide and is separated into uneven lobes. The calyx is tiny, and the corolla tube is narrow. Two sets of four stemmen were present, along with a two-celled, two-ovule ovary. In the axils of opposing leaves, inflorescences are produced in pairs. Compact, dome-shaped inflorescences that are 2-3 cm across and have 20–40 sessile flowers are present. Even after several cuts, the robust root system continues to produce new, fresh shoots.

Fig No. 1 : Lantana Camara Leaf

Phytochemical composition: The phytochemical makeup of L. camara has been the subject of much research in recent decades. According to reports, the main phytochemical groups found in various parts of L. camara include essential oils, phenolic compounds, flavonoids, carbohydrates, proteins, alkaloids, glycosides, iridoid glycosides, phenyl ethanoid, oligosaccharides, quinine, saponins, steroids, triterpens, sesquiterpenoides, and tannin. [3]

2) Clove

The term "lavang" is typically used to describe cloves. The relevance of plants in human life has grown daily as a result of their improved nutritional and therapeutic qualities. Native to the eastern Indonesian islands of Maluka, clove is a topical evergreen tree in the Myrtaceae family. This is frequently used as an expectorant to treat digestion issues, oral ulcers, dental discomfort, and insect repellant. Antioxidant, antipyretic, antiviral, antimicrobial, anti-diabetic, anti-inflammatory, analgesic, antiplatelet, anti-stress, anti-disease, and anti-carcinogenic in cervical cancer are all properties of clove, a pharmacologically active medicinal plant. Eugenol (80%–90%), eugenyl acetate (15%–17%), beta-caryophyllene (5%–12%), alpha-humulene (0.55%), alpha-terpenyl acetate (0.1%), and methyl eugenol (0.2%) are among the most important phenolic chemicals found in cloves. Clove oil's primary ingredient, eugenol, has potent antioxidant properties. Clove's primary bioactive component, eugenol, ranges in concentration from 9 381.70 to 14 650.00 mg/100 g of fresh plant weight. Gallic acid has a higher quantity among the phenolic acids (783.50 mg/100 g fresh weight). [4]

Fig no. 2 : Clove

Taxonomy :

Table no. 3 : Taxonomy of Clove

Kingdom	Plantae	Subclass	Rosidae
Domain	Eukaryota	Superorder	Myrtanae
Subkingdom	Viridaeplantae	Order	Myrtales
Phylum	Tracheophyta	Suborder	Myrtineae
Subphylum	Euphyllophytina	Family	Myrtaceae
Infraphylum	Radiatopses	Genus	Syzgium
Class	Magnoliopsida	Specific epithet	Aromaticum

3) Cinnamon

The name cinnamon, which comes from a Latin word meaning "sweet wood," comes from the inner bark, which is thought to be the primary component of evergreen cinnamon trees.is a member of the plant kingdom's Lauraceae family1.According to Gruenwald, Freder, and Armbruester (2010), there are two primary types of cinnamon.Vietnamese and Indonesian people grow cassia. And Ceylon cinnamon, which is grown in Sri Lanka and India. Cinnamon was first traditionally used as a sweet spice and a condiment with a strong flavor (Kim, S.H.; Hyun, S.H.; Choung, S.Y. 2006). The herb's primary constituents are (root) camphor, (bark) cinnamon aldehyde, and (leaf) eugenol. All of its parts contain comparable hydrocarbons in different amounts (Shen et al. 2012). [5]

Fig no. 3 : Cinnamon

Chemical Constituent :

Table No. 4 : Percentage chemical compound in cinnamon

Compound	Percentage %
Eugenol	70 to 95 %
Cinnamaldehyde	65 to 80 %
Camphor	60 %
Cinnamyl acetate	42 to 54 %

4)Ginger

The Zingiberaceae family includes ginger (Zingiber officinale), which was initially grown in Asia (Malaysia and Indonesia). Many patients take this plant as one of the most popular herbal supplements to cure a variety of ailments. Based on its size, rhizome color, and chemical composition, Z. officinale comes in three varieties: Z. officinale var. officinale (little white ginger, emprit), Z. officinale var. amarum (giant or big white ginger, badak or gajah), and Z. officinale var. Compared to other varieties of ginger, Z. officinale var. rubrum has a higher concentration of essential oils, which intensifies its pungent flavor and aroma. Numerous studies support the positive effects of red ginger on disease symptoms, including its anti-inflammatory, antioxidant, antiemetic, antibacterial, and antidiabetic properties. Z.officinale var. rubrum is regarded as a safe herbal remedy with negligible negative side effects. [6]

Fig no. 4 : Ginger

Taxonomy :

Table no. 5 : Taxonomy of Z. Officinale var. Rubrum

Kingdom :	Plantae
Division :	Magnoliophyta
Class :	Liliopsida
Order :	Zingiberales
Family :	Zingiberaceae
Genus :	Zingiber
Species :	Zingiber officinale
Variety :	Zingiber officinale var. rubrum

Preliminary Qualitative Phytochemical Analysis

This study was carried out to identify the presence of secondary metablosim in plant. The aqueous extracts of Lantana camara leaf, clove, cinnomon and ginger was prepared and preliminary phytochemical analysis were performed by using the following standard method.[7]

EXPERIMENTAL :

Table no. 6 : Phytochemical screening test of lantana camara leaf :

Test	Test to be performe	Obesevarion	Result
Carbohydrate	Molish test	Violet ring of at the junction of two liquid	+
Steroid	Liebermenn's test	Blue color appears	+
Glycoside	Liebermenn's test	Blue color appears	+
Flavonoid	Sulphuric acid	Yellow color precipitate	+
Tannin and phenolic	Lead acetate	White ppt	+
Alkoloid	Mayers test	Gives ppt	+

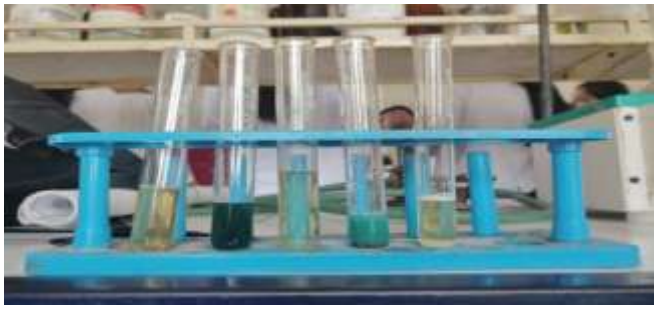

Fig no. 5 : Lantana camara leaf

Table no. 7 : Phytochemical screening test of clove :

Test	Test to be performe	Observation	Result
Carbohydrate	Molish test	Violet ring of at the junction of two liquid	+
Flavonoid	Sulphuric acid	Yellow color precipitate	+
Tannin and phenolic	Acetic acid	Red color solution	+
Alkaloid	Mayer's test	Gives ppt	+
Steroid	Liebermann's test	Blue color appears	+
Glycoside	Liebermann's test	Blue color appears	+

Fig no. 6 : Clove

Table no. 8 : Phytochemical screening test of cinnomon :

Test	Test to be performe	Observation	Result
Carbohydrate	Molish test	Violet ring of at the junction of two liquid	+
Reducing Sugar	Benedict's test	Green, red or yellow solution	+
Volatile oil	Solubility test	Soluble in liquid	+
Steroid	Liebermann's test	Blue color appears	+
Alkaloid	Mayers test	Gives ppt	+

Fig no. 7 : Cinnomon

Table no. 9 : Phytochemical screening test of Ginger :

Test	Test to be performe	Observation	Result
Carbohydrate	Molish test	Violet ring of at the junction of two liquid	+
Steroid	Liebermann's test	Blue color appears	+
Foam	Foam	Foam observed	+
Flavonoid	Sulphuric acid	Yellow color precipitate	+
Tannin and Phenolic	Lead acetate	Red color solution	+

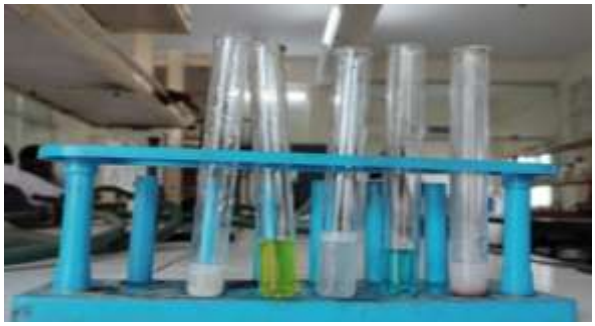

Fig no. 8 : Ginger

LOSS ON DRYING (Moisture Conetnt) :

Weigh about 1 g of powdered drug into a weighed flat and thin porcelain dish. Dry in the hot air oven at 100 degree C or 105 degree C. Until two consecutive weighing do not differ by more than 0.5 mg. Cool in a desiccators and weigh. The loss in weight is usually recorded as moisture.[7]

Table no. 10 : Calculation of lantana camara leaf :

Time	Weight
15 Minute	71.30
30 Minute	70.00
45 Minute	69.5
60 Minute	69.5

Formula :

Moisture Content = W-d/W x 100
Where W = Wet weight (75)
d = Dry weight (69.5)

Moisture content = 75 – 69.5/75 x 100
= 5.5/75 x 100
= 7.33 %

Fig no. 9 : Loss on drying of lantana camara leaf

Table no. 11 : Calculation of clove

Time	Weight
15 Minute	67.55
30 Minute	67.51
45 Minute	67.48
60 Minute	67.48

Formula :

Moisture Content = W-d/W x 100
Where W = Wet weight (67.62)
d = Dry weught (67.48)

Moisture content = 67.62 – 67.48/ 67.62 x 100
= 0.14/ 67.62 x 100
= 0.2

Fig no. 10 : Loss on drying of clove

Table no. 12 : Calculation of Cinnamon

Time	Weight
15 Minute	68.73
30 Minute	68.70
45 Minute	68.68
60 Minute	68.68

Moisture Content = W-d/W x 100
Where W = Wet weight (68.82)
d = Dry weight (68.68)

Moisture content = 68.82 – 68.68 / 68.82 x 100
= 0.14 / 68.82 x 100
= 0.2 %

Fig no. 11 : Loss on drying of cinnomon

TOTAL ASG VALUE :

Weigh and ignite flat, thin, porcelain dish or a tared silica crucible. Weigh about 2 g of the powdered drug into the crucible support the dish on a pipeclay triangle placed on a ring of retort stand. Heat with a burner, using a flame about 2 cm high and supporting the dish about 7 cm above the flamr, heat till vapors almost cease to be evolved; then lower the dish and heat more strongly until all the carbon is burnt off. Cool in a desiccator. Weigh the ash and calculate the percentage of total ash with reference to the air dried sample of the crude drug.[7]

Calculation of lantana camara leaf :

Weight of the empty dish = 'x' = 23.75 gm
Weight of the drug taken = 'y' = 2 gm
Weight of the dish + Ash (after complete incineration) = 'z' = 23.81 gm
Wt. of the ash = (z-x) g
= 23.81 – 23.75
= 0.06 gm
'y' g of the crude drug gives (z-x) g of the ash
100g of the crude drug gives 100/y*(z-x) g of the ash
Total Ash value of the sample = 100 (z-x)/y %
= 100 (0.06) / 2
= 3 %

Fig no. 12 : Lantana camara leaf total ash value of Before and After

Calculation of clove :

Weight of the empty dish = 'x' = 22.47 gm
Weight of the drug taken = 'y' = 2 gm
Weight of the dish + Ash (after complete incineration) = 'z' = 22.61 gm
Wt. of the ash = (z-x) g
= 22.61 – 22.47
= 0.14 gm
'y' g of the crude drug gives (z-x) g of the ash
100g of the crude drug gives 100/y*(z-x) g of the ash
Total Ash value of the sample = 100 (z-x)/ y %
= 100 (0.14) / 2
= 7 %

Fig no. 13 : Clove total ash value before and after

Calculation of Cinnamon :

Weight of the empty dish = 'x' = 22.47 gm
Weight of the drug taken = 'y' = 2 gm
Weight of the dish + Ash (after complete incineration) = 'z' = 22.87 gm
Wt. of the ash = (z-x) g
= 22.87 – 22.47
= 0.09 gm
'y' g of the crude drug gives (z-x) g of the ash
100g of the crude drug gives 100/y*(z-x) g of the ash
Total Ash value of the sample = 100 (z-x)/ y %
= 100 (0.09) / 2
= 4.5 %

Fig no. 14 : Cinnomon total ash value before and after

WATER SOLUBLE EXTRACT : Weigh about 4 g of the corsely powdered drug in a weighing bottle and transfer it to a dry 250 ml conical flask. Fill a 100 ml graduated flask to the delivery mark with the solvent (Chloroform water). Wash out the weighing bottle and pour the washings, together with the remainder of the solvent into the conical flask cork the flask and set aside for 24 hours, shaking frequently (Maceration). Filter into a 50 ml cylinder. When sufficient filtrate has collected, transfer 25ml of the filtrate to a weighed, thin porcelain dish, as ash value determination. Evaporate to dryness on a water bath and complete the drying in an oven at 105° C for 6 hys cool in a desiccator for 30 minutes and weigh immediately. Calculate the percentage w/w of extractive with reference to the air dried drug.[7]

Calculation of lantana camara leaf :

25 ml of chloroform water extract gives = 0.1 g of residue
100 ml of chloroform water extract gives = 4x g of residue
Since 5 g of air-dried drug gives 0.1 g of water (90%) soluble residue.
100 g og air dried drug gives x g of the water(90%) solute residue.
X = 100 x 0.1 / 5
x = 2 %

Fig No. 15 : Water soluble extract of lantana camara leaf

Calculation of Clove :

25 ml of chloroform water extract gives = 0.09 g of residue
100 ml of chloroform water extract gives = 4x g of residue
Since 5 g of air dried drug gives 0.09 g of water (90%) soluble residue.
100 g og air dried drug gives x g of the water(90%) solute residue.

X = 100 x 0.09 / 5
x = 1.8 %

Fig No. 16 : Water soluble extract of Clove

Calculation of Cinnamon :

25 ml of chloroform water extract gives = 0.08 g of residue
100 ml of chloroform water extract gives = 4x g of residue
Since 5 g of air dried drug gives 0.08 g of water (90%) soluble residue.
100 g og air dried drug gives x g of the water(90%) solute residue.

X = 100 x 0.08 / 5
x = 1.6 %

Fig No. 17 : Water soluble extract of cinnamon

Table no. 13 : Physico-chemical parameters

Sr. no	Physical contents	Lantana camara leaf	clove	cinnomon
1.	Loss on drying	7.33 %	0.2 %	0.2 %
2.	Total ash value	3 %	7 %	4.5 %
3.	Water soluble extract	2 %	1.8 %	1.6 %

MATERIAL AND METHOD

A] MATERIAL

1. Plant material

I. Lantana camara leaves

Lantana camara is a flowering shrub known for its rough, hairy leaves. The leaves are oval-shaped, green, and opposite (grow in pairs). They have a strong odor when crushed, often described as pungent or sharp. The leaf edges are serrated (toothed). Lantana leaves contain various chemical compounds like lantadene A and B, which can be toxic to animals if ingested. They are used in some traditional medicines for their antimicrobial, antifungal and anti-inflammatory properties, but caution is needed because of their toxicity.

II. Clove

Clove (Syzygium aromaticum). Clove is the dried flower bud of the clove tree. It has a strong aromatic smell and pungent taste. Major chemical: Eugenol (responsible for most activities).

Activities: Antimicrobial (kills bacteria and fungi), Analgesic (pain relief, especially for toothache), Anti-inflammatory (reduces swelling), Antioxidant (protects cells from damage), Digestive stimulant (helps in digestion). The main compound, eugenol, is very effective against many types of fungi, like Candida albicans (which causes infections in humans). Clove oil and extracts are often studied for their strong antifungal properties in both medicine and food preservation.

III. Cinnamon

Cinnamon (Cinnamomum species). Cinnamon is the dried inner bark of the tree, mainly from Cinnamomum verum or Cinnamomum cassia. It has a sweet, warm aroma and spicy taste. Major chemical: Cinnamaldehyde (gives its flavor and activity). Activities: Antimicrobial, Antioxidant, Anti-inflammatory, Antidiabetic (helps lower blood sugar) and antifungal activity.

IV. Ginger

Ginger (Zingiber officinale). Ginger is the underground stem (rhizome) of the ginger plant. It has a spicy, pungent flavor and a strong aromatic smell. Major chemicals: Gingerol, Shogaol, and Zingerone. Activities: Anti-inflammatory, Antioxidant, Antiemetic (prevents nausea and vomiting), Antimicrobial and antifungal activity.

2. Excipients

a) Ethanol

Chemical formula: C_2H_5OH (or sometimes written as CH_3CH_2OH). Common names: Ethanol, ethyl alcohol, alcohol. Appearance: Colorless, volatile liquid. Odor: Mild, characteristic alcohol smell. Taste: Slightly sweet

Main Properties: Boiling point: ~78.37°C (173.1°F). Melting point: ~-114.1°C (-173.5°F). Solubility: Completely miscible with water. Flammability: Highly flammable

Uses: Beverages: Found in alcoholic drinks (beer, wine, spirits), Fuel: Used as a biofuel additive for gasoline (called gasohol when mixed), Industrial: Solvent in perfumes, paints, medicines, and disinfectants, Medical: Used as an antiseptic (hand sanitizers, disinfectants)

b) Glycerine

Glycerine (also called glycerol): Chemical formula: $C_3H_8O_3$. Other names: Glycerin, glycerol. Appearance: Colorless, odorless, thick (viscous) liquid. Taste: Sweet

Main Properties: Boiling point: ~290°C (554°F), Melting point: ~18°C (64°F), Solubility: Completely miscible with water, Nature: Non-toxic, hygroscopic (absorbs water from air)

Uses: Pharmaceuticals: In cough syrups, wound treatments, and skin creams (as a moisturizer), Food industry: Used as a sweetener, preservative, and to keep foods moist, Cosmetics: In soaps, lotions, toothpaste for smoothness and moisture, Industrial: Used in making explosives (like nitroglycerin), antifreeze, and plastics.

c) Distilled water

Distilled water is pure water that has been boiled into vapor and then condensed back into liquid. This process removes impurities, minerals, and contaminants. Chemical formula: H_2O (same as regular water). Appearance: Clear, colorless, and tasteless.

Main Properties: Purity: Very high — free from salts, minerals, and most bacteria. pH: Slightly acidic (~5.5–7), because it absorbs carbon dioxide from air.

Uses: Medical: Used in hospitals for sterilizing equipment and in injections. Laboratory: For experiments needing pure water. Automotive: In car batteries and cooling systems (to avoid mineral

buildup). Cosmetics: Used in skincare products. Home appliances: In irons and humidifiers to prevent scale formation.

d) Eucalaptus oil

Source: Eucalyptus oil is extracted from the leaves of eucalyptus trees, especially Eucalyptus globulus. Main component: Eucalyptol (also called cineole) — gives it the strong, fresh smell. Appearance: Clear to pale yellow liquid with a sharp, refreshing scent.
Main Properties: Odor: Strong, minty, and fresh. Taste: Bitter (not usually consumed directly). Solubility: Not soluble in water, but soluble in alcohol and oils
Uses: Medicinal: Relieves cough, cold, and congestion (inhaling vapors), Soothes sore muscles (in balms and ointments), Acts as an antiseptic for minor cuts and wounds.

e) Preservative

Chemical formula: C_6H_5COONa. Other names: Benzoate of soda, sodium benzoate. Main Properties: Appearance: White, crystalline powder, Odor: Odorless or slightly sweet, Solubility: Soluble in water, alcohol, and glycerin, pH: Slightly acidic in solution.
Uses: Food preservation: Sodium benzoate is commonly used as a preservative in foods and beverages (such as soft drinks, pickles, sauces, and jams) to prevent the growth of bacteria, yeast, and molds. Cosmetics and Pharmaceuticals: Used in cosmetics, personal care products (like lotions and shampoos), and medicines to extend shelf life and prevent microbial contamination. Industrial uses: Used in dyes, plastics, and as a corrosion inhibitor.

B] METHOD

2) Preparation of plant extract

DECOCTION METHOD

Aqueous Extract

These extract which are medicinal preparations are inteded to be used immediately after preparation or to be preserve for use. Three methods are generally more in utility for their preparation.

Decoction

This is the ancient and more popular process of extracting water soluble and heat stable constituents from crude drugs by boiling them in water for about 15 minutes. The boiled crude drug water mixture is then cooled, filtered and sufficient volume of cold water is passed through the drug to produce the required volume.[8]

Fig no 18 : Decocation of Active ingredients

ANTIFUNGAL ACTIVITY

We cultivate fungi like Candida albicans and make a culture. The culture was spread out on the agar in a Petri dish. After that, we create tiny holes in the agar called wells and fill them with the liquid solution. A control is also added, which might be either antifungal medication (positive) or plain water (negative). The plates are stored at around 30°C. We then look for clear areas surrounding the wells. These transparent patches demonstrate that the fungus has been inhibited from developing by the liquid drop. The liquid drop antifungal action is stronger the larger the clear zone.

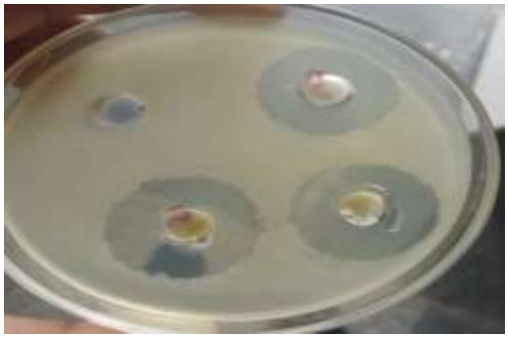

Fig no. 19 : Antifungal Activity

FORMULATION TABLE

Sr no.	Ingredients	Quantity	uses
1.	Polyherbal Extract	4.5 ml	Active Pharmaceutical Ingredeint
2.	Ethanol	6 ml	Cleasing
3.	Glycerine	2.5 ml	Humectant
4.	Distilled Water	15 ml	Vehicle
5.	Eucalaptus oil	1 ml	Fragrance
6.	Sodium benzoate	1 g	Preservative

METHOD OF PREPARATION :

- Take 4.5 ml of polyherbal extract in 500 ml of beaker, then add 6 ml of ethanol and 15 ml distilled water.
- Then above solution mixed into glycerine and add Eucalaptus oil as a essential.
- Stir the mixture thoroughly to ensure proper blending of all ingredients.
- Lastly add Sodium benzoate as a preservative.

Fig No. 20 : Liquid drops formulation

EVALUATION PARAMETER

Physical Property :

Color	Yellowish
Appearance	Clear

Determination of PH :

PH can be determined by using digital PH meter. Take 10 ml of final liquid solution in the 25 ml off beaker.[8]

Fig no. 21: PH meter

Determination of Viscosity :

Determination of viscosity by using ostwald viscometer. Fill the viscometer, previosly wasged and completely dried, with the liquid under examination through tube L to slightly above the mark G, using a long pippete to minimise wetting the tube above the mark. Place the tube vertically in a water bath maintained at the temperature indicated in the monograph and allow to stand for not less than 30 min to allow the temperature to reach equillibrium. Adjust the volume of the liquid so that the bottom of the meniscus settles at the mark G. Suck or below the liquid to a point about 5 mm above the mark E. After releasing pressure or section, measure the time taken fore the bottom of the meniscus to fall from the top edge of the mark E to the top edge of the mark F.[8]

Formula for Viscosity :

$n_2 = p_2t_2 / p_1t_1 \times n_1$

Where,

p_1 and p_2 are densities

t_1 and t_2 are times in second

n_1 and n_2 are viscosities

Observation table :

Liquid	Time of flow (sec)			Mean time (t) (sec)	Density(p) (g/ml)	Viscosity(n) (cp)
	1	2	3			
Water test	35.55 sec	44.49 sec	54.60 sec	44.88 sec	1 g//ml	0.89 cp
Formulation test	99 sec	96 sec	88 sec	94.33 sec	0.94 g/ml	1.64 cp

Calculation of viscosity :

$n_2 = p_2t_2 / p_1t_1 \times n_1$

$n_2 = 0.94 \times 88 / 1 \times 44.88 \times 0.89$

$n_2 = 82.72 / 44.88 \times 0.89$

$n_2 = 1.84 \times 0.89$

$n_2 = 1.64$

Fig no. 22 : Ostwald Viscometer

Determination of Density :

The density of liquid can be determined by using an pycnometer. Clean the pycnomete (specific gravity bottel) with chromic acid and nitric acid, and rinse with purified water. Note the weight of empty dry bottel (W_1). Fill the pycnometer with 10 ml of water and weight it (W_2). Finally note the weight of bottle with 10 ml of liquid (W_3).[8]

Formula for density

W_1-Weight of empty specific gravity bottle = (15.90)

W_2- Weight of empty specific gravity bottle + 10 ml of water. = (25.60)

W_3- Weight of empty specific gravity bottle + 10 ml of liquid. = (25.38)

Density of liquid = $(W_3-W_1)/(W_2-W_1) \times$ Density of water

Calculation of density

Density of liquid = (25.38 – 15.90) / (25.60 – 15.60) x 1

= 9.48 / 9.7 x 1

= 0.97 g/ml

Determination of specific gravity

Formula for specific gravity
Specific gravity = W_3/W_2

Calculation :

Specific gravity = 25.38 / 25.60
= 0.99 g/ml

Fig no. 23 : Density

Determination of antifungal test :

Take a cotton fabric cloth, moist in water and keep a side for 10 to 15 days. After 15 days observed the cloth, too see the grow of fungas on the fabric. Take the fabric and dissolved in liquid formulation for 15 to 20 minutes, wash the cloth. Stable for some minute and then obeserved under microscope to remove the fungas clearly.

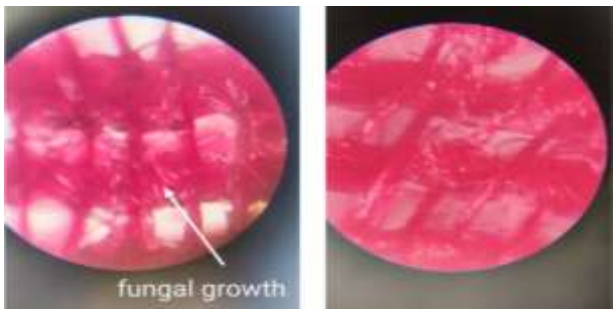

Fig no. 24 : Antifungal Test

Irritancy Test :

On the dorsal surface of the left hand, mark the area. After applying the liquid to the location, the time was recorded. After that, it is monitored for irritability, erythema and any edema up to 24 hours and reported. The result indicate that are no symptoms of irritation with the liquid.[9]

Determination of Solubility :

The formulation tested for accelerated stability, stable sample are analyzed for three month at room temperature and higher temperature (40 to 50 degree). Both room temperature and higher temperature were used to observe the formulations.[10]

Fig no. 25 : Solubility

RESULT

The result obtained in this study suggest that herbal formulation prepare and possess antifungal activity the component of herbal liquid formulation was selected due to their reported action that's plays prevention of fungas. Liquid formulation passes all physical parameter and shows the significant antifungal activity.

Table no. 16 : Evaluation parameter

Sr no.	Parameter	Formulation
1.	PH	4.40 PH
2.	Viscosity	1.64 cp
3.	Density	0.97 g/ml
4.	Specific gravity	0.99 g/ml
5.	Irritancy test	No irritation
6.	Solubility	Soluble in water
7.	Stability	Stable at room temperature

CONCLUSION

Lantana camara leaves, Cinnamon, clove, and ginger are potent natural antifungals that, when combined, create a powerful herbal solution for combating a wide variety of fungal infections. They are effective, safe, and sustainable alternatives to synthetic antifungal agents.

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